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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/762,551	FUTAMI ET AL.
	Examiner	**Art Unit**
	DAVID S. KIM	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1-5, 10, and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (U.S. Patent No. 6,081,355, hereinafter "Sharma") <u>in view of Rubinstein (U.S. Patent No. 3,430,048)</u>.

Regarding claim 1, Sharma discloses:

A method of providing a multi-wavelength light source, comprising the steps of

modulating an optical pulse source so as to output optical pulses with a designated repetition frequency (e.g., 22 in Fig. 9);

time-division multiplexing the optical pulses output by said optical pulse source by branching (e.g., optical distributor 61) the optical pulses output by said optical pulse source to N paths and multiplexing (e.g., star coupler 62) the branched optical pulses so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency fo ("factor of N" in col. 10, l. 29-30), wherein a time difference among the respective paths is 1/(N*(fo)) (a time difference between respective paths is T/N = (1/fo)/N = 1/(N*(fo)) because T is the pulse period, which is the inverse of the pulse frequency fo), and so that polarization states of the branched optical pulses are equal after being multiplexed (notice the co-planar characteristics of the pulses in the pulse diagram above star coupler 62, implying equal polarization states); and

demultiplexing wavelengths of the optical pulses with the repetition frequency which is the integral multiple of said designated repetition frequency so as to output said wavelengths as the multi-wavelength light source (output in Fig. 9).

Sharma does not expressly disclose:

time-division multiplexing the optical pulses output by said optical pulse source by branching the optical pulses output by said optical pulse source to N paths and multiplexing the branched optical pulses so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency fo, wherein a time difference among the respective paths is 1/(N*(fo)), and so that ***intensities*** and polarization states of the branched optical pulses ***are equal after being multiplexed***.

However, time-division multiplexing so that "intensities are equal after being multiplexed" is known in the art, as exemplified by Rubinstein (e.g., "equal-amplitude pulses" in col. 2, l. 17-19, equal amplitude corresponds to equal intensity). Clearly, the intensities of the branched optical pulses of Sharma will have some kind of relationship to each other. The choices are that they could be different or they could be equal. Either choice is an obvious variation of Sharma. Thus, an obvious variation would include time-division multiplexing so that "intensities are equal after being multiplexed". Rubinstein provides an example of choosing an arrangement where they are equal. Additionally, one of ordinary skill in the art generally expects optical pulse generators to provide optical pulses with uniform characteristics, including intensity. That is, an optical pulse generator that provides optical pulses with non-uniform characteristics would introduce engineering complications related to accommodating or tolerating these non-uniform characteristics.

Regarding claim 2, Sharma in view of Rubinstein discloses:

An apparatus for providing a multi-wavelength light source, comprising:

an optical pulse source which is modulated so as to output optical pulses with a designated repetition frequency fo (22 in Fig. 9);

a time-division multiplexing unit which branches (e.g., optical distributor 61) the optical pulses output by said optical pulse source to N paths and multiplexes (e.g., star coupler 62) the branched optical pulses so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency fo ("factor of N" in col. 10, l. 29-30), wherein a time difference among the respective paths is 1/(N*(fo)) (a time difference between respective paths is T/N = (1/fo)/N = 1/(N*(fo)) because T is the pulse period, which is the inverse of the pulse frequency fo), and so that intensities (Rubinstein, e.g., "equal-amplitude pulses" in col. 2, l. 17-19, equal amplitude corresponds to equal intensity) and polarization states of the branched optical pulses are equal after being multiplexed (notice the co-planar characteristics of the pulses in the pulse diagram above star coupler 62, implying equal polarization states);

and a wavelength demultiplexing unit which demultiplexes wavelengths of the optical pulses with the repetition frequency which is the integral multiple of said designated repetition frequency so as to output said wavelengths as the multi-wavelength light source (output in Fig. 9).

Regarding claims 3-4, Sharma in view of Rubinstein does not expressly disclose:

(claim 3) The apparatus for providing a multi-wavelength light source as claimed in claim 2, wherein said time-division multiplexing unit is a Mach-Zehnder-interferometer-type time-division multiplexing apparatus.

(claim 4) The apparatus for providing a multi-wavelength light source as claimed in claim 2, wherein said time-division multiplexing unit is a Michelson-interferometer-type time-division multiplexing apparatus.

However, these branching time-division multiplexing units are known and common in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ any of these or other known and common branching time-division multiplexing units in the apparatus of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this since one would recognize that any suitable branching time-division multiplexing unit would provide the basic desired function of providing higher pulse repetition frequency in the apparatus of Sharma (e.g., col. 9, l. 51-52, 64-65; col. 10, l. 4-5, 29-31, 37-40).

Regarding claim 5, Sharma in view of Rubinstein discloses:

The apparatus for providing a multi-wavelength light source as claimed in claim 2, wherein said time-division multiplexing unit time-division multiplexes said optical pulses using a plurality of optical waveguides with different optical path lengths (paths from 61 in Fig. 9)

Sharma in view of Rubinstein does not expressly disclose:

said optical waveguides are arranged in *a planar lightwave circuit*.

However, planar lightwave circuits (PLCs) are well known in the art. Sharma discloses an example (51 in Fig. 8). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to embody the plurality of optical waveguides of Sharma in view of Rubinstein (paths from 61 in Fig. 9) in a planar lightwave circuit. One of ordinary skill in the art would have been motivated to do this since PLCs provide more component stability than other embodiments of a plurality of optical waveguides, such as loose links of fibers.

Regarding claims 10-11, claims 10 and 11 are claims that introduce limitations that correspond to the limitations introduced by claims 1 and 2, respectively. Therefore, the recited limitations in claims 1-2 read on the corresponding limitations in claims 10-11.

4. **Claims 6-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Rubinstein, as applied to the claims above, and further in view of Morioka et al. ("Multiwavelength picosecond pulse source with low jitter and high optical frequency stability based on 200 nm supercontinuum filtering", hereinafter "Morioka").

Regarding claim 6, Sharma in view of Rubinstein does not expressly disclose:

The apparatus for providing a multi-wavelength light source as claimed in claim 5, wherein said wavelength demultiplexing unit is a wavelength demultiplexer having a multi-peak structure with a center transmission frequency spacing which is the integral multiple of said designated repetition frequency.

However, Morioka discloses the use of an arrayed-waveguide grating (AWG) wavelength demultiplexing unit (Morioka, AWG in Fig. 1). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ such a wavelength demultiplexer in the apparatus of

Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this since Sharma in view of Rubinstein cites the use of such a wavelength demultiplexer in the background of the art (AWG of Morioka via col. 1, l. 14-18 of Sharma). Additionally, AWGs have a multi-peak structure with a center transmission frequency spacing. Moreover, the exact value of the frequency spacing of the AWG is a flexible design parameter with a wide range that encompasses the integral multiple of said designated repetition frequency. One reasonable motivation for employing such a frequency spacing is that greater frequency spacing in wavelength demultiplexers, including the frequency spacing of an integral multiple of said designated repetition frequency, is generally associated with less demanding manufacturing and component tolerances, which leads to cheaper costs.

Regarding claim 7, Sharma in view of Rubinstein and Morioka discloses:

The apparatus for providing a multi-wavelength light source as claimed in claim 6, wherein said wavelength demultiplexer is an arrayed waveguide grating filter (Morioka, AWG in Fig. 1).

Regarding claim 8, Sharma in view of Rubinstein and Morioka does not expressly disclose:

The apparatus for providing a multi-wavelength light source as claimed in claim 7, wherein said planar lightwave circuit and said arrayed waveguide grating filter are provided on one board.

However, the integration of multiple components into one unit/housing/board is an extremely common practice in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to do so with various components in the apparatus of Sharma in view of Rubinstein and Morioka. One of ordinary skill in the art would have been motivated to do this since it is well known that integration generally provides benefits such as more compact apparatuses, economies of scale, and faster operation speeds.

5. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Rubinstein, as applied to the claims above, and further in view of Watanabe et al. (European Patent Application, EP 1 185 007 A2, hereinafter "Watanabe").

Regarding claim 9, Sharma does not expressly disclose:

The apparatus for providing a multi-wavelength light source as claimed in claim 2, further comprising a spectrum-broadening unit which broadens spectrum of the optical pulses which are received

at said time-division multiplexing unit, said spreading effected by a non-linear medium having a third-order non-linear effect.

However, such spectrum-broadening units are known in the art, as shown by Watanabe (e.g., nonlinear optical waveguides/fibers in Figs. 2-3, 9, and 15). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to include such a spectrum-broadening unit(s) to broaden the spectrum of the optical pulses which are received by the time-division multiplexing unit of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this for any variety of exemplary beneficial applications disclosed in Watanabe, such as suppression of a reduction in optical signal-to-noise ratio (Fig. 2 and paragraph [0040]) and noise removal (Figs. 3-4 and paragraphs [0044-0049]). Additionally, a broader spectrum in the apparatus of Sharma in view of Rubinstein could lead to a wavelength demultiplexing unit with less narrow frequency spacing requirements, which is generally associated with less demanding manufacturing and component tolerances, which leads to cheaper costs.

6. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Rubinstein, as applied to the claims above, and further in view of Weiner et al. (U.S. Patent No. 7,142,789 B1, hereinafter "Weiner") and Hall et al. (U.S. Patent Application Publication No. 2002/0003641 A1, hereinafter "Hall").

Regarding claim 12, Sharma in view of Rubinstein does not expressly disclose:

An apparatus as in claim 2, further comprising a polarization controller through which the optical pulses output by said optical pulse source pass, and a variable optical attenuator and a variable delay unit arranged in each path, so that the intensities and the polarization states of the branched optical pulses are equal after being multiplexed.

Regarding the polarization controller, Examiner takes Official Notice that such a device is well known in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a polarization controller through which the optical pulses output by said optical pulse source of Sharma in view of Rubinstein pass. One of ordinary skill in the art would have been motivated to do this for the common purpose of providing any particular arbitrary polarization state to the optical

pulses of Sharma. Moreover, notice that the optical pulses output by said optical pulse source are polarized (Sharma, co-planar pulses input into 61 in Fig. 9). A polarization controller is an obvious device to provide such polarization to the optical pulses of Sharma.

Regarding the variable optical attenuator, such a device is well known in the art, as exemplified by Weiner (e.g., programmable intensity modulators in col. 2, l. 39-41, programmable attenuator in col. 6, l. 18-19, programmable intensity modulator in col. 6, l. 19-20). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a variable optical attenuator arranged in each path of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this since Sharma in view of Rubinstein is relatively silent about how to provide the "equal intensity" pulses. That is, Weiner speaks into this silence with suitable details. Notice that fixed optical attenuators of Weiner are used to provide "equal intensity" pulses (Weiner, col. 2, l. 17-21). Weiner then teaches that variable optical attenuators also constitute a suitable alternative (Weiner, col. 2, l. 39-41), so using variable optical attenuators would constitute an obvious variation.

Regarding the variable delay unit, such a device is well known in the art, as shown by Hall (252 in Fig. 8). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a variable delay unit arranged in each path of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this to relieve the need to control the precise length of each path (Hall, paragraph [0101]), thus easing manufacturing tolerances.

Response to Arguments

7. Applicant's arguments filed on 28 February 2008 have been fully considered but they are not persuasive. Applicant presents four salient arguments.

Regarding the first argument, Applicant states:

> Therefore, claim 1 specifically recites that *intensities and polarization states of the branched optical pulses are equal after being multiplexed.* In item 9 on page 7 of the outstanding Office Action, the Examiner asserts that the pulse diagram at the output of the star coupler 62 in FIG. 9 of Sharma shows "uniform height and co-planar characteristics of the pulses". The Examiner then asserts that this showing of uniform height and co-planar characteristics implies equal intensities and polarization states.
>
> However, it is respectfully submitted that the pulse diagram in FIG. 9 of Sharma is a rough drawing and is not intended to show features such as equal intensities. As an example, as different pulses travel the different paths 1/N, 2/N and 3/N shown in FIG. 9 of Sharma, the pulses

> traveling one of the paths would have small differences in intensity as compared to different pulses traveling a different path, due to the differences in lengths of the different paths. These small differences in intensities would be too small to be seen in the rough pulse diagram in FIG. 9 of Sharma.
>
> Therefore, it is respectfully submitted that Sharma does not disclose or suggest that intensities of the branched optical pulses are equal after being multiplexed as recited, for example, in claim 1.

(REMARKS, middle of p. 5, emphasis Applicant's).

Regarding the point of "the pulse diagram in FIG. 9 of Sharma is a rough drawing and is not intended to show features such as equal intensities", such a characterization of Sharma is only Applicant's interpretation of Fig. 9. Sharma does not expressly state or suggest that Fig. 9 is "not intended" to show equal intensities. Thus, Applicant is speaking into a silent portion of Sharma. Accordingly, this point is not persuasive.

Regarding the "example" of the "small differences in intensities", again, Sharma is silent about such a scenario. Thus, Applicant is speaking into a silent portion of Sharma. Accordingly, this point is not persuasive. Furthermore, although such a scenario is possible, it is definitely not inherent. Applicant's own disclosure provides an alternate scenario where differences in lengths of different paths do not result in different intensities (Applicant's Fig. 7 and p. 11, l. 8-13). Thus, Applicant's "example" is not persuasive.

Moreover, notice the application of teachings from newly discovered Rubinstein. Accordingly, this argument is not persuasive.

Regarding the second argument, Applicant states that there are no mechanisms inserted in the different paths 1/N, 2/N, 3/N (REMARKS, bottom of p. 5, top of p. 6).

Notice the following portion from Sharma about Fig. 9:

> FIG. 9 shows a sixth embodiment of the multi-wavelength light source according to the present invention. This embodiment has no polarization switching unit and is characterized by the use of an optical splitter 61, a star coupler 62 and multiple WDM demultiplexers (two in this example). In other respects, the arrangement of this embodiment is the same as that of FIG. 3. In this figure, like reference numerals are used to denote corresponding parts to those in FIG. 3 and repeated descriptions thereof are omitted herein.
>
> Instead of using 3-dB couplers this multi-wavelength light source uses a one-to-N optical distributor 61 which distributes an optical pulse train to a number N of paths that provide relative delaying of the optical pulse trains by 0, T/N, 2T/N, 3T/N, . . . , (N-1)T/N (T=the pulse period and N=4 in the figure). The delayed pulse trains are multiplexed together by an N-to-N star coupler

> 62. Thereby, the pulse repetition frequency of the optical pulse train can be increased by a factor of N.
>
> The multiplexing star coupler 62 has N output ports, thus permitting an optical pulse train to be sent over each of N paths. Light pulse trains on the respective paths can be applied to WDM demultiplexers 631 and 632 for demultiplexing into optical components of different wavelengths.
>
> Of course, the arrangements shown in FIGS. 8 and 9 can be combined to obtain a desired number of paths and a desired multiplication factor by which the pulse repetition frequency of the optical pulse train is increased.
>
> (Sharma, col. 10, l. 13-40).

Examiner respectfully notes that Sharma is silent about any positive recitation of a *lack* of mechanisms inserted in the different paths 1/N, 2/N, 3/N. Rather, Sharma focuses on "paths that provide relative *delaying*". Thus, Applicant is speaking into a silent portion of Sharma. Even though Sharma may not positively show or describe any particular mechanism in the paths 1/N, 2/N, 3/N, Sharma does not positively recite that there are "no mechanisms" inserted in the different paths 1/N, 2/N, 3/N. That is, the presence or absence of any mechanisms may simply be outside of the scope of Sharma's focus on "paths that provide relative *delaying*". Accordingly, this argument is not persuasive.

Regarding the third argument, Applicant states:

> On page 7 of the Office Action, the Examiner asserts that it would be obvious to include a variable optical attenuator in each path of Sharma "to provide fine amplitude/intensity control of each optical pulse". However, Sharma does not recognize any problems associated with fine differences in amplitude/intensity. Moreover, the Examiner has not shown any references which suggest any problems associated with fine differences in amplitude/intensity in a configuration as in Sharma. Moreover, FIG. 9 of Sharma is clear in that there are no mechanisms inserted in the different paths I/N, 2IN, 3IN. Therefore, any insertion of a variable optical attenuator would be contrary to that shown in Sharma, and may cause complications with the specific operation of Sharma. For example, column 10, lines 22-31, of Sharma, disclose specific delaying times of each path. Any insertion of optical attenuators in Sharma will significantly alter these delay times of Sharma, and cause problems with the operation of Sharma.
>
> (REMARKS, middle of p. 6).

Regarding the point of "problems associated with fine differences in amplitude/intensity", Examiner respectfully notes that the positive recognition of "problems associated with fine differences in amplitude/intensity" is not logically required to implement "fine amplitude/intensity control". Rather, it is a feature that one may choose to implement for any variety of reasons, such as control of additional parameters. Accordingly, this point is not persuasive.

Regarding the point of "FIG. 9 of Sharma is clear in that there are no mechanisms inserted in the different paths I/N, 2IN, 3IN", notice the treatment of this point in Applicant's second argument above. Accordingly, this point is not persuasive.

Regarding the point of "optical attenuators" causing "problems with the operation of Sharma", notice the application of teachings from newly discovered Rubinstein and Weiner. Rubinstein expressly brings to Sharma the practice of time-division multiplexing so that intensities are equal after being multiplexed. Weiner speaks into the silence of Sharma in view of Rubinstein by showing how to provide such equal intensities by using optical attenuators. Accordingly, one would not encounter problems with optical attenuators in the operation of Sharma in view of Rubinstein and Weiner. Accordingly, this point is not persuasive.

Summarily, this argument is not persuasive.

Regarding the fourth argument, Applicant states:

> Moreover, on page 7 of the Office Action, the Examiner asserts that it would be obvious to include a variable delay unit in each path of Sharma "to relieve the need to control the precise length of each path, thus easing manufacturing tolerances." However, as disclosed in column 10, lines 22-31, of Sharma, relatively delays are created by using different path lengths. The insertion of a variable delay unit in each path of Sharma would be contrary to the approach of Sharma. Moreover, any insertion of variable delay units in Sharma will significantly alter the delay times of the paths of Sharma, and cause problems with the operation of Sharma.
>
> Instead, the applicant again notes that FIG. 9 of Sharma is clear in there are no mechanisms inserted in the different paths I/N, 2IN, 3IN.

(REMARKS, bottom of p. 6).

Examiner respectfully directs attention to column 10, lines 22-31, of Sharma:

> Instead of using 3-dB couplers this multi-wavelength light source uses a one-to-N optical distributor 61 which distributes an optical pulse train to a number N of paths that provide relative delaying of the optical pulse trains by 0, T/N, 2T/N, 3T/N, . . . , (N-1)T/N (T=the pulse period and N=4 in the figure). The delayed pulse trains are multiplexed together by an N-to-N star coupler 62. Thereby, the pulse repetition frequency of the optical pulse train can be increased by a factor of N.

Notice that this portion of Sharma discloses "paths that provide relative delaying", not "different path lengths" as stated by Applicant. Moreover, notice that the variable delay unit teachings of Hall are used in the context of a relatively advantageous way to provide desired amounts of delay. Paragraph [0101] of Hall discloses that the use of variable delay units in Fig. 8 provides the advantage of not having to

precisely control the optical path lengths of each of a plurality of arms 16. Fig. 2 of Hall discloses an embodiment where precise control of the optical path lengths of each of a plurality of arms 16 is a critical concern (paragraphs [0061-0066]). As the use of variable delay units in Fig. 8 of Hall would be comparatively advantageous over another way of providing desired amount of delay, incorporating this principle to Sharma's "paths that provide relative delaying" would be comparatively advantageous over another way of providing desired amount of delay. In short, Hall provides a variation that would be advantageous in combination with Sharma, not causing problems with the operation of Sharma. Accordingly, this argument is not persuasive.

Summarily, Applicant's arguments are not persuasive. Accordingly, Examiner respectfully maintains the standing rejections.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kato et al. (U.S. Patent Application Publication No. 2003/0043451 A1) is cited to show time-division multiplexing branched optical pulses so that intensities of the branched optical pulses are equal after being multiplexed (Fig. 11 and Fig. 12B, equal intensity is implied by Fig. 12B in comparison to Fig. 13A; equal intensity is also implied by paragraph [0088] since all the pulses of Fig. 12B are converted to the same $\lambda 1$ by optical frequency converter 203, which converts pulses of the same intensity to the same wavelength, paragraphs [0067-0071] and Fig. 6).

Leaird et al. (U.S. Patent No. 6,577,782 B1) is cited to show the usage of various elements in each guide of a waveguide array that outputs a pulse train with equal intensity pulses (col. 13, l. 62 – col. 14, l. 15, col. 14, l. 32-45).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID S. KIM whose telephone number is (571)272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. S. K./
Examiner, Art Unit 2613

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613